Claims

1. A plasma electron source having a function of a cathode for a gaseous discharge apparatus, comprising inner and outer pole pieces made as bodies of revolution having central holes, with a magnetomotive force source arranged between them, and comprising also, placed in a sealed housing, an arc diaphragmed hollow cathode with a gas feed device as well as, installed between the coaxial outlets of the cathode and housing, intermediate and main anodes made as bodies of revolution having central holes, characterized in that the intermediate anode, the inner pole piece, the main anode and the outer pole piece are installed successively between and in line with the outlets of the cathode and housing; in that the main anode is made of a magneto-weak material and positioned so that at least 30% of the magnetic flux created in the space between the pole pieces flows through its hole; and in that the inner and outer pole pieces are electrically connected with the cathode.

2. The electron source according to claim 1 characterized in that it is provided with an annular header connected to a supplementary gas feed device; and in that the header is provided with holes to supply gas to the space between the pole pieces.

3. The electron source according to claims 1 or 2 characterized in that the minimum diameters of the holes, d - in the cathode, D_1 - in the intermediate anode, D_2 - in the inner pole piece, and D_3 - in the outer pole piece, respectively, are related to each other by the following ratio: d: D_1 : D_2 : D_3 = 1 : 10k : 50k : 100k, where k = 1 ± 0.5; and in that the ratio of the gap L_1 between the pole pieces to the minimum diameter D_3 of the hole in the outer pole piece is equal to L_1 : D_3 = 1 ± 0.4.

4. The electron source according to claims 1 or 2 characterized in that the main anode is made as a hollow cylinder whose inside diameter D_4 and length L_2 are in the following ratios to the minimum diameter D_3 of the hole in the outer pole piece: D_4 : D_3 = 1.3 ± 0.3, and L_2 : D_3 = 1.3 ± 0.3, respectively.

5. The electron source according to claims 1 or 2 characterized in that the main anode is made as a hollow truncated cone whose smaller base faces the inner pole piece, the inside diameter D_6 of the larger base and the height H of the cone are in the following ratios to the minimum diameter D_3 of the hole in the outer pole piece: D_6 : D_3 = 1.3 ± 0.3, and H : D_3 = 1.3 ± 0.3, respectively, and the inside diameter D_7 of the smaller base is in the following ratio to the minimum diameter D_2 of the hole in the inner pole piece: D_7 : D_2 = 1.5 ± 0.5.

6. The electron source according to claims 1 or 2 characterized in that the magnetomotive force source is mounted beyond the sealed housing made of a magneto-weak material.

7. The electron source according to claims 1 or 2 characterized in that the magnetomotive force source is made of a hard magnetic material as a hollow cylinder and is a component of the sealed housing.

8. The electron source according to claims 1 or 2 characterized in that mounted on the external side of the outer pole piece is an expander whose minimum inside diameter D_5 exceeds the minimum diameter D_3 of the hole in the outer pole piece by as much as 1 to 1.6 times.